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POLICY CONSIDERATION IN EXPANDING INDUSTRIAL DEVELOPMENT

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POLICY CONSIDERATIONS IN EXPANDING INDUSTRIAL DEVELOPMENT

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1. An increasing number of Western theorists who are concerning themselves with the problems of economic development in the less-developed countries are finding more and more social pre-conditions that must be satisfied before economic and therefore industrial development can occur. Literacy, political stability and recognized central government authority, an administrative class, an educated elite, a functioning and pervasive juridical system, are all examples of the preconditions which are being talked about.

2. Some writers are convinced that because industrialization has never been successfully carried out in a tropical country, it represents an unlikely probability even with the latest technological and financial aids. Some insist that a remarkable sociological mutation must occur before a new society can develop from older and more primitive forms; while some argue that an intensive application of modern science and technology can help to sublimate the need for this mutation. There are many more preconditions to economic development which are being discussed, and if we were to give equal weight to them all, we could come to the forlorn conclusion that social, economic, and industrial development are impractical ideals.

3. There are several observations which I want to make about this early trend in analysis: First, the process of history is going to continue regardless of theoretical or dogmatic models; and the movement to change and to modernize by the developing countries, stimulated by a growing sense of nationality, is going to proceed one way or another, but proceed it will. This, it seems to me, is inevitable.

4. Second, theoretical approaches should not be interpreted as dogma or be allowed to regress into dogma. The theoretical approaches which I have used as examples represent the recent beginnings of a welcome awareness of the need for research and analysis in this field. They should be regarded, however, as trial and error efforts to abstract common sequential occurrences as guides to development processes and policies. Systematic speculation in this field is new; and the speculators very often tend to apply available abstractions, derived from the reality of Western socio-economic development over the past several hundred years, to the concrete realities of present day unindustrialized countries. I suspect that even in highly abstract and complex mathematical formulations of growth models, input factors contain inarticulate constants reflecting normative rules of behavior characteristic of modern Western industrial society. This can lead to misapplication in approach and practice. It also can lead in the latter instance to a tendency to believe that the best practice in the U.S. or the U.K., or France or Germany is the best practice everywhere.

5. There have been, on the other hand, important historical departures from the generally accepted interpretation of the socio-economic historical sequence.

Some countries have developed without much primitive accumulation of capital, some without monetary stability, and some in the absence of public order or land reform. I personally agree with those who think that the commonly denominated historical attributes of Western development probably will not be applicable in the same degree or in the same order for these countries where a latter day industrial revolution is commencing---a revolution which is occurring within a technologically advanced framework which was undreamt of during the early phases of Western industrial development.

6. Third, all this points up the requirements for more empirical data and more intensive research about the development process not only by industrialized countries but, more importantly, by the developing societies themselves.

7. Innovation and experiment in both theory and practice are needed. When theory and practice collide, new theories will need to be discovered. Our present knowledge, for example, is deficient about the human and institutional resource problems of developing countries; about the ways in which technical assistance can contribute most effectively to growth and change; about the ways in which scientific and technological knowledge can be adapted to the unique needs of nearly a hundred countries; and about the possibilities of new or inverted sequences in the development process.

8. In my view, the most important conceptual starting point for economic and industrial development is the national development plan and a systematic approach to its implementation.

9. When we speak of a less developed country, we are not really clear about what we mean beyond a generalization that it is a country which did not until recently develop a national motiviation to industrialize, and, based on rough estimates, that it is a country which, to the disadvantage of its individual citizens, suffers from a comparatively low per capita income. In most cases our definition must stop at this point since beyond it we encounter all manner of diversities of historical, ethnic, cultural, and institutional factors. The national plan is the most useful device available to take account of these unique characteristics. At the same time it provides the basis of a coherent effort to accelerate the development process through the establishment of comprehensive goals, the choice of specific objectives, the allocation of resources commanded by the government, and the establishment of correlative guidelines and incentives for the private sector. The planning effort not only sorts out development possibilities and limitations in quantitative terms but also reveals the gaps in essential data. Through its implementation, and its correction and refinement through experience, systematic planning also can highlight the economic processes which require more research and analysis, particularly where deviations from historical Western norms need to be made.

10. The national plan has a very important collateral function. It provides an important guide to the amount, type and timing of recurrent external assistance requirements. Rapid industrial development combined with reasonable political and economic stability presents extremely complex problems for public policy-makers, especially in countries where the rate of saving is barely reflected in institutional capabilities, and the advantageous effect of saving is offset by a growth of population which exceeds that of national income. It is obvious that developing countries must supplement their savings with resources supplied from the outside. The only alternatives are the abandonment of the democratic ideal, social regression and possibly chaos, or the introduction of compulsion and force for a long time to come at all levels of the social structure.

11. While it is not hard to see that "substantial" outside assistance is needed for investment, consumption, and manpower training needs, it is not easy to determine the magnitude, the types, or the timing of requirements. The West has barely begun to think in terms of an integrated approach to the provision of assistance. More

attention has been given thus far to the amounts now being supplied, and what more could be supplied than to the problem of a rational determination of requirements and agreement about supplier responsibility. And here, I must point out that it is not easy to organize an integrated Western capital assistance and training effort. The demand for capital is increasing in developed nations because of new technologies, defense requirements, a rapid growth in population, and, most importantly, increased consumption due to income redistribution. It is a serious challenge to the Western industrialized countries therefore to move toward agreement, as a very general principle, to provide one per cent of their gross national product for external assistance, and satisfactorily to organize its provision. It is equally a challenge to the developing countries to develop requirements in concrete and progressive terms and in conformity with rational development objectives. The sometimes vague estimates on the basis of which assistance is now being provided need to be made more significant and explicit. This is not to say that assistance can or should wait upon ideal circumstances. But it does mean, it seems to me, that developing countries should set a high priority on a concurrent development of institutional capabilities which will enable them to fix quantitative targets and input requirements, on a comparable basis, by time periods much more coherently than is generally the case today. This process is not only essential for estimating what can be done, and at what rate, but a rational determination of requirements can be a useful catalyst to growing Western efforts to organize and coordinate the means to help satisfy these requirements. I would carry this reasoning a step further: It is unrealistic to expect aid suppliers continuously to provide scarce capital inputs to maximize output on a predominantly supplier estimated basis. It is also unrealistic to expect that national and international suppliers can coordinate their efforts reasonably well in the absence of organized direction from planning and implementing agencies operated by the receiver. The developing country therefore needs to create or improve institutional facilities to acquire the essential data for planning, and to improve on plans in the light of practical experience.

12. It is in this field of technical institution-building that modern training methods and new techniques of observing and analysing data can quicken the pace of national planning and estimating. I should like to stress in this case, and in the other suggestions to follow, that I do not intend the implication that well-rounded and modern data collection and analysis services must be in operation as a precondition to national planning or the development process. On the contrary, I suggest that you start the planning process with the data available; and that, while the trial and error process develops empirically, you build-up concurrently more efficient and more broadly based data collection and analysis institutions. The process of institution-building can and ought to be associated with the current planning, project analysis, and implementation process itself.

13. All planning must be based on empirical data. Comprehensive planning requires aggregate estimates of the economy, by economic sector, for past periods. Since goals can be defined only in terms of data about the country's material, financial, and manpower resources, data are needed on population, agriculture, employment, production, income, consumption, investment, savings, and international trade. A program for generating and disseminating statistical information must be centered in the Government. It is the only agency with a broad enough base to assume the responsibility for maintaining an up-to-date inventory of human and material resources.

14. The organization or improvement of a central statistical data collection and analysis agency is an essential ingredient in this effort. Its initial functions, for the planning process, are the compilation and analyses of basic statistics

through censuses; and the compilation and analyses of derived statistics, such as national income estimates.

15. There are other important areas of necessary knowledgeability about a country's resources which I will mention only briefly, since they will be developed more fully in other sessions of this Conference. But I identify them in this context not only because of their utility for national planning but because they are also fields to which I believe much greater attention should be given by both developing and industrialized countries in shaping technical assistance programs for the benefit of the former. An inventory of natural resources, including mineral, agricultural and forest resources, requires effective geodetic control and mapping. Transportation and communications planning can be developed only on the basis of a combination of accurate geodetic controls and economic planning. Maps can be designed to serve specific objectives. The accurate topographic map is the basis for special maps for industrial cadastral, geological, hydrological, irrigation, flood control, and other important planning purposes.

16. Weather and climate exert a major influence in shaping the course of economic development. Even in tropical climates where the impact of day-to-day changes are small, seasonal or long term trends have significant effects on the national economy. Industrial planning should be related to the characteristics of weather and climate and the effects which these will have on a changing economic structure. This suggests the early institutionalizing of data collection and analysis in the related fields of meteorology and hydrology.

17. While there are other important central institutional capabilities which will need to be developed for other branches of the earth sciences and in such fields as industrial standards and patents, I feel that the data requirements for planning purposes place a high priority on the census and central statistical agency, and the geodetic and meteorological services, since so many other sector plans depend upon them.

18. In these fields very considerable technological advances have been made in the last quarter century which permit accurate, correlative and rapid data accumulation and analysis. Also---and here I can speak only for the United States---we have developed effective and systematic training methods and techniques of institution-building in these fields, through many years of operation of our technical assistance programs.

19. Most newly developing countries have a shortage of foreign exchange, an inadequate rate of savings, and an insufficient supply of investment capital. Are there economic planning and implementation techniques that have proven effective in the older industrialized societies which can help the newly developing countries develop faster in the face of these shortages?

20. The answer, I believe, is clearly affirmative, provided the country adopts an operational approach to the development process. By operational I mean that goals are set, alternatives are examined to achieve these goals, choices are made, progress is reviewed objectively, and corrections made. This process, which involves a combination of national income analysis and applicable developments in industrial planning, is perhaps best described as a feedback process. It can be used at a national level and an enterprise level, by government enterprise or private enterprise. These techniques which I have in mind are basically measurement techniques and are not solutions for complex socio-political problems of development, nor are they a magic prescription to bring the development process to an arbitrary goal of economic self-sustenance. They do not depend for their operational validity upon a priori doctrine, but, on the other hand, they are not a substitute for good judgment or common sense. One of their objectives is to reduce the probability of

concrete error through an analytic trial and error process and to contribute to a rationalisation of the economic decision-making process at the national level so that you will have a better idea of where you have been, where you are, and where you are going. Another objective is to provide techniques which can, with some training, be understood and used at various operating levels in government and in the private sectors; and which can evolve in expertness through experience.

21. Effective economic development will require the synchronization of the national plan and the individual projects. Because a great deal has been written about national planning (or macro planning) I shall only sketch the essential elements of this process since I wish to suggest in more detail an approach to project (micro) planning--an area which has been given much less attention. 1/

22. The national plan must be based, in the first instance on a resources and demand analysis. This analysis should result initially from a quick survey of available natural resources, skills and facilities such as power, transportation and manufacturing. It should indicate past patterns of imports and exports and contain reasonable guesses about probable increases in demand for imports, the possibilities for increased exports, availabilities of raw material imports, and external financial assistance. These estimates, because they are quickly arrived at, will be rough and obviously susceptible to considerable margins of error. But because planning and implementation of economic development is sequential and consists of interdependent activities, the resources and demand analysis can and should be consistently refined and amplified as a result of experience with implementation. An important objective of the initial resource and demand analysis is to identify obvious opportunities for quick gains, generally involving higher production from existing resources; and to uncover major opportunities that have a longer lead time.

23. Aggregate goals and limitation of the economy over time also should be tentatively developed in a macro-economic analysis. An analysis, however preliminary and tentative, of important economic variables, such as the capital output ratio, the rate of saving, population growth, the propensity to import, are important indicators for a realistic appraisal of the national economic potential.

24. The potential, which will shift through time both qualitatively and quantitatively, can be set down initially as a tentative national plan which provides preliminary goals--goals which are as specific as feasible about the nature and timing of major project undertakings, as well as, for example, about the anticipated development of income, savings and investment. It is important to understand that the whole process represents a dynamic and interconnected flow through time periods and not a random series of static pictures. The magnitudes involved will be components of national income analysis. The past is the takeoff point for future plans. The present measurements are the guides to past achievements.

25. The de facto plan is the selected projects, the implementation of the selected projects, with the timing of implementation a critical dimension. In the context of the newly developing countries, project selection is necessarily a rationing of very scarce resources.

26. It is in the working out of the project selection and implementation process that the overall economic plan will stand or fall, and it is to this process of selection that the calculation of relative advantage must be directed as dispassionately as possible.

1/ The suggested approach to project evaluation and selection is being developed for publication by Morris J. Solomon, Chief, Operations Research Branch, Statistical Research Division, Bureau of Census, United States Department of Commerce.

27. Where there is no choice, there is no problem. Such a situation will be extremely rare. A Five- or Seven-Year Plan for a country will provide an overall framework for projects, and normally there will be a large range of alternatives for achieving the same purpose. The essence of decision-making is not only to choose among alternatives but to choose the best project viewed from different angles. We all recognise that new nations very often want to have a large hydro-electric project rather than smaller thermal projects, or want a larger rather than a smaller steel mill, or a large aluminum plant, or an automobile factory, and want a great many of these things very soon; and that there are important political pressures favoring such choices. In some instances it may be necessary to select a project which is more important in political than in economic terms. But it is important to have a measure in quantitative terms of the comparative cost, over time, between the politically motivated and the economically satisfactory project. You should analyze the comparative cost advantages of similar projects, and of inter-regional projects; and of the comparative benefits, of social and economic projects. While projects can also be chosen to satisfy criteria which are difficult to assess in quantitative terms, you can approximate the cost and rate of return of such projects and explore the feasibility of dealing with these requirements by other instruments of national policy. For example, inequality of income is often affected by the choice of projects, but this need not be the compelling motivation in shaping a project if there are other methods of helping the problem, such as tax policy, institutional reform, public works or even welfare expenditures.

28. It is possible to analyze projects so that:

(a) The central planning authorities have a basis for choosing those projects which are best from a national point of view.

(b) Technical personnel of the operating unit can use known national criteria for shaping the project so that it is most desirable considering both the national and enterprise point of view.

(c) The form of analysis facilitates implementation.

29. A method of project analysis that has the above characteristics facilitates the synchronization of the national plan and the individual projects. It also provides for the unity of planning and the implementation at the operating level. The resulting coupling of planning and implementation sets the stage for feedback at all levels of activity. The feedback cycle is completed with the measurement of results and the impact of these results on the succeeding cycle.

30. It is essential that the measurement of results be made in a spirit of genuine diagnosis rather than as a confirmation of accepted policy, doctrine, or theory.

31. While the national economic plan will assume and approximate the availability of physical and financial inputs, the demand for outputs and the general interrelationship of projects, individual project analysis generally requires a more detailed market study, a physical resources flow plan and a financial plan.

32. The physical flow plan is developed in real terms--labor, materials, land--together with estimates of the time when each tangible input and output takes place. An important element in planning is a comparison of alternative plans in order to be able to choose the most promising in terms of:

.various scales of plant
.alternative locations
.alternative time phasing
.alternative raw materials
.making or importing needed materials or commodities

Each alternative is capable of being shown as a comparable physical resources plan. While there is some appeal to making decisions on the basis of physical factors alone, any attempt to compare alternatives by this device runs into difficulty because of the purely physical non-comparability of many of the factors in each alternative. You may, for example, end up with a judgment which turns on a comparison of man-days and a ton of imports. Or a serious error in judgment may be committed in evaluating labor intensive versus capital intensive projects. This problem can be handled through the development of a financial plan and the assignment of weights (prices) to the various components. By treating the weighted values as additive it is possible to develop a uniform basis for comparison of alternative projects. The problem of what kind of weights to use, not only to produce comparable data in alternative projects, but also for other factor inputs and outputs in order to correct for differences between market prices and social values, is a complicated one, but one where recent advances in the use of "shadow" prices and linear programming can be of great help.

33. The financial plan should include the domestic investment schedule, the foreign exchange and investment schedule, and conventional profit and loss estimates. The result of these assessments will provide other important common measures for comparing projects.

34. Thus far we have outlined the form by which projects can be quantitatively described and comparatively judged. One of the most important procedural steps in analyzing a project, however, is the time phasing of its physical and financial inputs and outputs. A project that takes five years to construct before output is realized is less desirable than a comparable one which takes three years. The flow of inputs and outputs should therefore be discounted for time. Again, we believe that we have developed programming and analysis techniques which can be of considerable help in determining the rate of return of alternative opportunities.

35. The analytical guides that have utility for evaluating the individual project are the rate of return to the enterprise and the rate of return from the social point of view.

36. The return to the enterprise, whether a government enterprise or a private firm, is essentially the discount money flow used by commercial organizations.

37. The social evaluation of a project is suggested in static form by the so-called capital output ratio. While such a ratio is roughly indicative for the economy as a whole, to deal more accurately with actual project complications, a number of qualifying features need to be incorporated to produce a more realistic basis of comparison for projects. This guide, the national gross rate of return, has been developed specifically to handle some of the influential complications in real life such as:

. time phasing of input and output
. discounting for time
. treatment of depreciation as an availability
. comparison among alternatives
. avoidance of fictitious value added by adjustment for difference in prices among alternatives
. taking tax revenues into account
. use of shadow prices for resources whose market prices do not reflect their social value, particularly foreign exchange

38. An additional analytical guide which reflects economic growth even more directly than the national gross rate of return is the surplus rate of return. A characteristic of the national gross rate of return is that it counts output as a benefit regardless of who receives it and regardless of how much of the resulting income is reinvested. The surplus rate of return is the discounted rate of return of the surplus flow generated by a project which is available for reinvestment. This especially meaningful measure of economic growth provides an answer to the question: "For each unit of surplus made available to the project, at what annual rate is a flow of surplus generated?"

39. Judging alternative projects from these various aspects (enterprise, national gross rate of return and surplus rate of return) not only permits a more rational selection in terms of maximum benefit, but in the course of this analysis facilitates modification of project design to remedy flaws that are demonstrated by the analysis.

40. Each analytical guide by itself is insufficient. One can think of common situations where reliance on one alone can lead to a poor project. For example, a project is proposed to manufacture a product presently imported with a 50 per cent duty levy. The proposed project calls for a prohibition of imports. The enterprise will sell the product to the consumer at the same price as the imported product. The enterprise rate of return is excellent. But due to a loss of tariff revenues the national gross rate of return is poor as is the surplus rate of return since both are measured in relation to the existing import duty. Or a flood control and irrigation project is proposed that is estimated to produce large increases in crops and income. The national gross rate of return is good, but the surplus rate of return is poor. The reason is that benefits accrue to small cultivators who are not taxed to pay for various services. If the rate of economic development is to be accelerated, the project would need to be modified so that a larger per cent of benefits become available for reinvestment.

41. Without the measurement guide of return on investment, projects will be approved on the basis of speculation, wishful thinking or dogma rather than on the basis of tangible and measurable advantage. It is an interesting commentary on the utility of this process, that Soviet engineers in their day-to-day work have persistently shifted toward criteria which closely resemble rates of return in the comparative evaluation of plans and projects.

42. The corollary of project selection is the process of project implementation. A good plan poorly implemented will give bad results just as a poor plan well implemented will give bad results. Here again, I think that our very considerable practical experience in modern industry and in highly sophisticated government-industry engineering projects can supply valuable guidance, provided the newly developing countries creatively adapt such techniques to the special circumstances of their own environments.

43. In connection with the problem of implementation, I should like, in conclusion, to mention a number of significant concepts arising out of recent management research. First, of course, is the concept of feed-back which is relatively old, but is each day demonstrating its validity and usefulness. Second, is the relatively great effectiveness of a multi-dimensional approach to human motivation. A policy on relying on one dimension of human motivation whether it is fear, monetary rewards, prestige, rank, patriotism, professional interest, security, is far less effective than a combination of all relevant dimensions. In fact, the fundamental task of management, whatever its formal structure, is to choose an effective mix of incentives.

44. Third, a closely related concept of recent research is the notion that social and economic situations often correspond to what the mathematicians call a non-constant sum game whose characteristic is that the various participants necessarily

gain together or lose together. This view of organized human activity is sharply differentiated from the constant sum game, where some constant value is divided among a fixed number of participants, and only where one or more participants "exploit" the others can these favored individuals gain.

45. The implications of these concepts for human affairs have been scarcely realized outside the narrow confines of specialists. The multi-dimensional approach to the problem of human motivation, the non-exploitive characteristics of gain in the mathematical theory of games, the concepts of "feed-back" and the "rolling method" of program review and revision have important implications for planning, plan implementation and plan revision. More research is needed on the practical applicability of these concepts, particularly in developing countries. But it is already quite clear that implementation of projects calls for close teamwork within the framework of a non-exploitive situation, and that a broad range of incentives must be used by governments of developing countries in the face of critical shortage of skilled manpower and management personnel. In addition, it is clear that planners must assume an important responsibility for implementation. The planners, separated from implementing responsibility are subject to optimistic bias. The implementers face the concrete reality of a program and this often makes them pessimistic. The two functions are not practicably separable and their organic connection is also important in relating the "feed-back" of empirical evidence to the planning process itself.

46. Each less-developed country has its own special problems. Each country's national and cultural revitalization will be shaped by its ideals and its history, and by the impact of modern science and technology. It is clear that management of scarce resources will play a critical role in the drive toward industrialization. The creative modification of known techniques for better planning and management deserves a substantial research effort by both industrially developed and developing countries. Such an effort has a potential for discovery which can mark the difference between acceleration and retardation of the development process.

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